

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.

### Inhaler.

I, JONAS KARL BERNHARDT, of Wilmshurst, in the Free State of Saxony, Germany, of German nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an inhaler with an air compressor which consists of two chambers through which the fresh air flows under pressure, one of said chambers being constructed to form a heatable water receptacle for the production of hot moist air, the other chamber being constructed to form a cooling or refrigerating device for the production of cold dry air and means being provided for alternating inhalation of cold air and then of hot air.

In apparatus of this kind according to the present invention the refrigerator is composed of two parts, one of them in form of an annular receptacle and one of cylindrical shape, the latter one comprising a bell which dips into said annular receptacle. The cylindrical receptacle is situated in the open part of the annular receptacle and the walls of these two parts confine a very small annular space through which the air to be cooled is forced, whilst the dip bell confines a space above the two parts in which the compressed air is collected.

In this manner it is possible to ensure that the air to be inhaled is sufficiently cooled to a low temperature although it has only a short travel to make through the apparatus and is exposed to the cooling action only for a very short time.

The invention further consists in providing means for producing the compressed air in a simple manner so that the apparatus can be used by any unskilled person.

The drawing illustrates the invention in two forms of construction.

Fig. 1 shows in vertical section the apparatus with a dip bell as air compressor.

Fig. 2 shows in vertical section the apparatus with a water jet blower built in moving as air compressor.

A receptacle 1 for water heated in a convenient manner and an inverted cylinder 2 mounted in the same about off the steam chamber 3. An annular receptacle 4 and a second receptacle 5 with a projecting dip bell 6 dipping into said annular receptacle 4 form together the cooler which is separated from the heated receptacle by an insulating partition 4. Any other separated arrangement of the two chambers may be chosen.

The compressed air produced in a manner which will be described hereafter flows from the supply pipe 10 into the distributing tube 11 and from there on the one hand under the bell 6 and further into the space between the walls of the two cooling receptacles, the inner of these two receptacles being tightly guided in the outer by means of guide ribs 7, to the tubular socket 17 into the aspirating pipe for cold dried air and on the other hand into the steam chamber 3 and to the tubular socket 13 for hot moist air.

The cooling receptacles are filled with ice or with water of such a temperature which is required for the individual demand. A horizontal sleeve 9 at the lower edge of the dip bell can be used for this purpose in order to keep the ice fragments down when a specially cold temperature is required. A very dry air of moderate temperature can be further produced if the inner receptacle is filled with a cold producing mixture the outer receptacle being filled with water. Any

graduation can be obtained as regards degree of cold or dryness. For the heating chamber the regulation by heating is sufficient.

Each aspirating pipe has a removable separator 15 for the reception of specimen or of the water of condensation and further a thermometer. The aspirating pipes are connected by means of rubber tubes and when not in use they are closed in a holder 19 so that the rubber tube is spaced. Instead of one aspirating socket several such sockets can be provided so that several patients can use one apparatus.

The description given relates to both forms of construction. For the production of air under pressure, which could be effected, for example, in any convenient manner, a dip bell 23 is provided according to Fig. 1 which is tightly guided in a receptacle 21 and which is adapted to take up in an upper space 22 water balanced in order to regulate the pressure accurately. To be filled the bell is lifted whereby the flap valve 24 is opened. The compressed air flows through a flexible tube 25 to the section and pressure gauge 20 of the above mentioned supply tube 10 so that a multiple of the filling of the dip bell is worked into the apparatus so that the dip bell can be built as a producer of high pressure, a corresponding amount of space being saved. It is particularly of each dimension that one filling determines also the time prescribed for the inhalation so that the aspirating tubes have to be changed each time when the bell is raised.

According to Fig. 2 the inner cooling receptacle is constructed so that it moves at the same time as a water jet injector from which the air jet is led through conduit 21 to a like section and pressure gauge 20 as used according to Fig. 1, now however mounted with the supply pipe 10 in the dip bell 6 and forcing the air within the space confined by the said dip bell and the water level in the annular receptacle 5 as well as in the chamber 4. In the top part of the dip bell 6 a water receptacle is arranged which serves as a ballast to keep the receptacle 6 at the lowest position shown in Fig. 2.

The water from the water main flows through the nozzle 26 in a sharp jet through the central pipe 27, drawing along the outer air through the openings 23 into the cylinder 6 and causing through the expansion tube 30, from which it may be drawn off by a rubber tube not shown in the drawing. A protecting plate 29 prevents air bubbles from getting into the expansion tube.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Inhaler with air compressor consisting of two chambers through which the fresh air flows under pressure, one of said chambers being constructed to form a heatable water receptacle for the production of hot moist air, the other chamber being constructed to form a refrigerating device characterized in that for the production of the cold dry air a refrigerator of cylindrical shape is provided which has a bell at its upper end dipping into the annular space of a second refrigerating built like an annular receptacle, the compressed air being delivered under said dip-bell.

2. Inhaler as claimed in Claim 1 characterized in that the lower edge of the dip bell of the inner cooling receptacle is provided with a horizontal perforated ring of sheet-metal or with a sleeve which keeps the ice fragments down in the annular space.

3. Inhaler as claimed in Claim 1 characterized in that an adjustable loaded dip bell like a gasometer serves as air compressor, said dip bell being raised in order to be filled working in fresh air through a flap valve, the compressed air being supplied to the two chambers by a section and pressure gauge inserted between said chambers and said air compressor.

4. Inhaler as claimed in Claim 1 characterized in that a water jet injector serves for producing the compressed air.

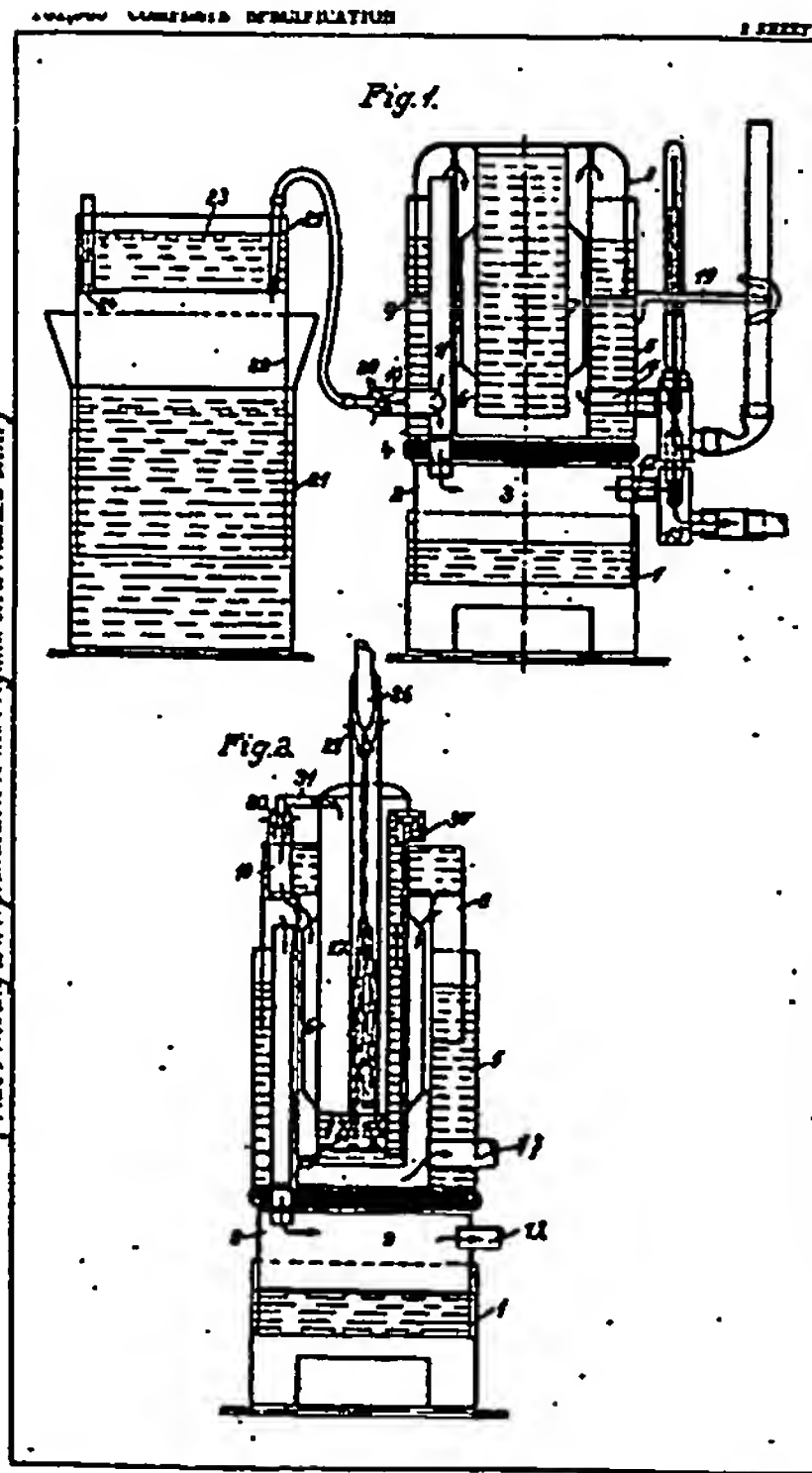
5. Inhaler as claimed in Claim 4 characterized in that the water jet injector is mounted in the inner refrigerator.

6. Inhaler as claimed in Claim 4 and 5 characterized by a tube for the water and air jet extending vertically deeply into the collecting space for compressed air but terminating above a protecting plate and by an expansion tube under the protecting plate for the outflow of the water.

Dated this 18th day of April, 1921.

FRANCIS HERON ROGERS,  
Agent for Applicant,  
Bridge House, 121, Queen Victoria  
Street, London, E.C.4.

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[This drawing is a reproduction of the original on a reduced scale]